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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/652,968 | 08/31/2000 | Vishnu K. Agarwal | 98-0616.12 | 4756 |

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EDWARDS W. BULCHIS, ESQ.
DORSEY AND WHITNEY LLP
U.S. BANK CENTRE,
1420 FIFTH AVENUE SUITE 3400
SEATTLE, WA 98101

EXAMINER

DIAZ, JOSE R

ART UNIT PAPER NUMBER

2815

DATE MAILED: 10/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/652,968

Applicant(s)

AGARWAL, VISHNU K.

Examiner

José R Díaz

Art Unit

2815

AW

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 July 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 43,44,76,78 and 81-85 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 43,44,76,78 and 81-85 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 25.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 78 is objected to because of the following informalities: the term "borane" should be changed to --diborane-- . Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 43-44, 76, 78, 81, and 84 are rejected under 35 U.S.C. 102(e) as being anticipated by Yamazaki et al. (US Pat. No. 6,355,512 B1).

Regarding claims 43, 76, 78, 81, Yamazaki et al. teaches a method comprising: layering a first conductive material (111) (see Fig. 1E); introducing said first conductive material (111) to a material (see arrows in fig. 1F) selected from the group consisting of diborane and phosphine (see col. 6, lines 47 and 58); applying electromagnetic energy (thermal or irradiation annealing) to the material introduced to the first conductive material (111) (see col. 3, lines 30-32); and layering a second conductive material (117)

over said first conductive material (please note that layer 114 is formed from layer 111) (see fig. 1G).

Regarding claims 44 and 84, Yamazaki et al. teaches that the step of applying electromagnetic energy comprises directing ultraviolet light (see col. 7, lines 11-12).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 82 and 85 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. (US Pat. No. 6,355,512 B1) in view of Ma et al. (US Pat. No. 4,013,485).

Regarding claims 82 and 85, Yamazaki et al., as stated before, teaches the step of thermal or irradiation annealing (i.e. ultraviolet) the material introduced to the first conductive material (see col. 3, lines 30-32, col. 6, lines 66-67 and col. 7, lines 11-12). However, Yamazaki et al., fails to teach RF annealing. Ma et al. teaches that it is well known in the art to use RF annealing (see col. 2, lines 39-40) at a power level ranging from about 50-1000 watts (see col. 2, lines 54-56).

Yamazaki et al. and Ma et al. are analogous art because they are from the same field of endeavor as applicant's invention. At the time of the invention it would have been obvious to a person of ordinary skill in the art to include radio frequency (RF)

energy as the electromagnetic source for annealing the material introduced to the first conductive material. The motivation for doing so, as is taught by Ma et al., is restoring the electrical properties of the structure (col. 2, lines 42-44, 47-49, and 57-59). Therefore, it would have been obvious to combine Ma et al. with Yamazaki et al. to obtain the invention of claims 82 and 85.

6. Claim 83 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. (US Pat. No. 6,355,512 B1).

Regarding claim 83, Yamazaki et al. is silent with respect to the power level applying during the ultraviolet annealing process. However, it would have been obvious to one of ordinary skill in the art to anneal the material by applying an ultraviolet energy at a power level ranging from about 50-3000 watts, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Huang*, 40 USPQ2d 1685,1688(Fed. Cir. 1996) citing *In re Aller*, 105 USPQ 233., 235 (CCPA 1955).

Response to Arguments

7. Applicant's arguments, see page 7, beginning at line 3, filed July 15, 2003, with respect to the rejection(s) of claim(s) 43-44, 76 and 78 under 35 U.S.C. 102(e) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Yamazaki et al. and Ma et al.

Correspondence

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R Díaz whose telephone number is (703) 308-6078. The examiner can normally be reached on 9:00-5:00 Monday, Tuesday, Thursday and Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JRD

A handwritten signature in black ink that reads "Tom Thomas". The signature is written in a cursive, slightly stylized font.

TOM THOMAS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800